

# **Using large scale aerial photography to evaluate riparian timber stand characteristics**

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The monitoring of riparian timber stand characteristics is becoming increasingly important in the adaptive management of forests and aquatic resources. The effectiveness of prescriptions to maintain important ecological functions provided by riparian forests is an important component of adaptive management. Monitoring programs must facilitate measurements of key processes and functions in different ecotypes. Repeatable and cost-effective methods are needed to measure varying stand and ecological characteristics such as tree height, species, down tree length, and position relative to the stream. A fixed-base camera system was developed to collect large scale photography (1:2,000) for the purpose of studying buffer zone characteristics in Alaska and Washington. This system was recently implemented as a replacement for field collection because it provides detailed 3D views of standing and down trees as well as a medium for their measurement. The system also allowed key characteristics to be determined such as decay class that allowed identification of the timing of mortality and recruitment processes (e.g. bank erosion versus windthrow) that allowed identification of the cause of mortality. The system was implemented for an extensive sampling program that included 1,700 photo pairs from 52 km of streams in Alaska and 108 photo pairs from 36 streams in Washington. The method facilitated a stratified random sampling study design in both cases. Validation sampling showed that the system measurement errors range from 0.2 to 1.8 percent horizontally and 1.2 to 2.6 percent vertically on a control field. In Alaska the use of large scale photography enabled detection of a significant reduction in stand density, stand mortality differences between logged and unlogged units, and the localization of mortality on the outer edge of the buffer. Analysis of the Washington data is still ongoing.

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